

Recalling the Integer Rules

Multiplying and Dividing integers: If signs are the same, the answer is positive.
If signs are different, the answer is negative.

Adding integers: If the signs are the same, the answer has the same sign.
If the signs are different, the answer has the sign of the larger number.

Subtracting integers: Add the opposite of the subtracted number.
Then follow the adding rules.

Integer Rules

+s and -ve number values

Multiplication and Division with Integers

$$(+3) \times (+6) = +18 \quad \text{Same sign} \Rightarrow +ve$$

$$-2 \times -4 = +8 \quad \text{different signs} \Rightarrow -ve$$

$$(-6) \times (+3) = -18$$

$$\frac{+18}{-2} = -9$$

$$(-14) \div (-7) = (+2)$$

$$(-4) \times (-2) \times (-3) = (-24)$$

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Addition

$$(-4) + (-2) = -6$$

$$(+3) + (+4) = +7$$

add terms, keep sign

$$(-4) + (+2) = (-2)$$

$$(+3) + (-2) = (+1)$$

subtract terms, keep sign of the larger

$$(-2) + (+6) = (+4)$$

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Subtraction

$$(-2) - (+6) = -8$$

$$(-2) - (-6) = +4$$

$$(-6) - (+2) = -8$$

add the opposite sign of the second term

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$$i) (-6) + (+2) = -4$$

$$ii) (-4) + (-2) = -6$$

$$iii) (-3) \times (-4) = +12$$

$$iv) \frac{(+6)}{-3} = -2 \quad v) (+2) + (-3) = -1$$

$$vi) (-6) + (-4) = -10$$

$$vii) (-6) - (+3) = -9$$

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Homework

Integer Worksheet 1-7 odds (a,c,e, ...)

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Operations with Rational Numbers (Fractions)

Rational numbers are numbers that can be expressed as the quotient of two integers, where the divisor is not zero.

Set of rational numbers: $Q = \left\{ \frac{a}{b} \mid a, b \in \mathbb{I}, b \neq 0 \right\}$

Addition and Subtraction

To add or subtract rational numbers, determine a common denominator.

Division

To divide by a rational number, multiply by the reciprocal.

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$

Multiplication

To multiply rational numbers, first reduce to lowest terms (if possible).

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

More Than One Operation

Follow the order of operations.

Mixed Fraction

Improper Fraction

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$$\frac{4}{5} - \frac{1}{10}$$

$$-\frac{1}{3} + \frac{1}{4}$$

$$\frac{5}{7} + \frac{1}{3}$$

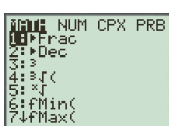
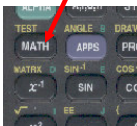
$$-6\frac{1}{4} + \left(\frac{-3}{4}\right)$$

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Adding or Subtracting Fractions: Find a common denominator(bottom) first, then add or subtract across the numerator (top).

Press



Press



Press



$$\frac{1}{2} + \frac{1}{5}$$

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Exponent Laws

3^4 and a^n are called powers.

$3^4 = (3)(3)(3)(3)$ $a^n = (a)(a)(a)\dots(a)$

Operations with powers follow a set of rules.

Rule	Description	Algebraic Expression	Example
Multiplication	When the bases are the same, keep the base the same and add exponents.	$(a^m)(a^n) = a^{m+n}$	$(5^4)(5^{-3}) = 5^{4+(-3)} = 5^{4-3} = 5^1 = 5$
Division	When the bases are the same, keep the base the same and subtract exponents.	$\frac{a^m}{a^n} = a^{m-n}$	$\frac{4^6}{4^{-2}} = 4^{6-(-2)} = 4^{6+2} = 4^8$
Power of a Power	Keep the base, and multiply the exponents.	$(a^m)^n = a^{mn}$	$(3^2)^4 = 3^{2 \times 4} = 3^8$

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$$3^2 \cdot 3^3$$

$$\frac{2^3}{2^6}$$

$$\frac{3^3 3^2}{3^5}$$

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Evaluate $(-3)^{-4}$.

Evaluate $\left(\frac{5}{6}\right)^{-2}$.

Evaluate $\frac{5^{-4}(5^8)}{(5^{-3})^2}$.

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This section is designed to give you practice using the exponent rules and not being able to get a numerical answer via your calculator. Some questions will ask you to substitute values in for x;

You MUST simplify the expression first with the variables then it can be used for any value.

$$\frac{x^7(y^2)^3}{x^5y^4}$$

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